

REMARKS

Claims 1-42, 47-52 and 57-71 were previously pending in this application, of which claims 1-41 and 60-65 are withdrawn from consideration. No claims have been amended, added or cancelled. As a result claims 42, 47-52, 57-59 and 66-71 are pending and under examination with claims 42, 50 and 57 being independent claims. No new matter has been added.

Affidavit of ting Wang, Ph.D.

Applicant submits herewith an Affidavit of ting Wang, Ph.D. (hereinafter “*Wang*”), overcoming the rejections outstanding against the claims of the instant application. Dr. Wang gives an opinion that the claimed invention is deserving of patent protection, as further described below.

Applicant has obtained the unbiased, independent opinion of Dr. Ting Wang, whose Affidavit is attached, and which will be referred to by numbered paragraph where applicable in this discussion. Dr. Wang’s qualifications are briefly set forth in *Wang*, paragraphs 1 – 3. As indicated in *Wang*, paragraph 4, Dr. Wang has reviewed the materials at issue in connection with the outstanding Office Action.

Rejection under 35 U.S.C. §112

Claims 42, 57-52 and 57-59 were rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the enablement requirement. This rejection is respectfully traversed in view of “*Wang*”.

Section 112, first paragraph of the patent statutes requires:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The statute does not require that the inventor explain the theory of operation or physics upon which the practice of the invention relies, but rather only that he describe “the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same,” along with setting forth the best mode.

In the instant application, Applicant has described the manner and process of making and using his invention in terms meeting the requirements of the statute.

Dr. Wang explains in *Wang*, paragraphs 6 – 8, why the description provided in the instant application complies with the statutory requirements of Section 112, first paragraph. Dr. Wang easily found that the source of energy for powering the invention from the environment was stated in the application. First, Dr. Wang notes that “The primary energy source of the osmotic pressure is from the environment. * * * The solute molecular momentum is powered by the ambient temperature.” (*Wang*, paragraph 6.) The relationship between temperature (T) and osmotic pressure (p) is defined by the van’t Hoff formula, $p=cRT$, which relates pressure and temperature through the solute concentration (c) and the gas constant (R). Dr. Wang cites paragraphs [0024] and [0025] of the published patent application (US 2005-0016924 A1), as well as US 2005-0016924 A1, paragraphs [0037] through [0040], as identifying the source of energy. (See, *Wang*, paragraph 6.) For example, US 2005-0016924 A1, paragraph [0025] identifies the source of energy as “[t]he heat from the surrounding environment (ultimately from the sun)”. As for obtaining energy from the vacuum produced by the process, the vacuum is certainly relied upon to store some energy from the process and use is made thereof. But, as explained by Dr. Wang,

The vacuum generated by the osmosis process is a pleasant by-product, but it should not be treated as the primary energy source because the most power the vacuum can provide is derived from one bar pressure force. Once the Examiner realizes that the primary energy source for the applicant's system is derived from the ambient temperature, this concern should be removed. [See, *Wang*, paragraph 7.]

Finally, the issue raised by the Examiner of whether the system is an unsustainable perpetual motion device powered, according to the Examiner, by the vacuum produced by operation of the invention is considered by Dr. Wang to be a misunderstanding on the part of the Examiner. (See, *Wang*, paragraph 8.) As Dr. Wang writes, “It seems the Examiner interpreted the optional method, as suggested in the patent application, for producing the vacuum by using the power generated by the system as an evidence of a perpetual machine; therefore, he judged the claimed system as ‘unsustainable.’ Again, this is another extension of the Examiner's earlier concern of ‘lack of the primary energy source.’” Dr. Wang has ascertained from the papers that, “the primary energy source for the applicant's system is derived from the ambient temperature.” (See, *Wang*, paragraph 7.) The vacuum is a by-product of the operation whose stored energy is put to

good use, but is not the external energy source. Dr. Wang further points out, "It is clear that using the osmosis process to produce vacuum as a by-product can save energy and is a better choice than using other energy to create vacuum." (See, *Wang*, paragraph 8.)

The Applicant has described his invention in the instant application in the terms required by statute. Dr. Wang was able, on reading the documents of record in this application, to discern the key points necessary to making and using the invention, contrary to the assertions by the Examiner in the outstanding Office Action. Dr. Wang opines that the explanation provided by the instant application is clearer than the explanation of similar technology found in one of the cited references applied later in the Office Action. (See, *Wang*, paragraphs 11 and 12.) Therefore, the claims conform to the statutory requirements of 35 U.S.C. §112, first paragraph.

Accordingly, withdrawal of the rejection of claims 42, 57-52 and 57-59 under 35 U.S.C. §112, first paragraph, is respectfully requested.

Rejections Under 35 U.S.C. §102

Claims 57-59 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 3,906,250 to Loeb (hereinafter *Loeb*).

As explained by Dr. Wang, *Loeb* simply fails to show a closed solvent chamber in which a vacuum develops. *Loeb* shows a solvent chamber in which ambient pressure exists, but a negative pressure does not develop because the chamber is open to inflow from outside. One must be careful identifying the "zero" against which pressures are measured and reported in *Loeb*, as well as identifying completely the operating method and characteristics of the *Loeb* apparatus. (See, *Wang*, paragraph 9.) Dr. Wang extensively and clearly explains that the *Loeb* apparatus does not develop a vacuum in the solvent chamber as required by these claims. The "zero" pressure of *Loeb* indicates a pressure equal to ambient, not an absolute "zero" denoting a vacuum. No vacuum is present; the "zero" pressure is gauge pressure not absolute pressure. (See, *Wang*, paragraph 9.)

At least one feature defined in claims 57-59 is not present in *Loeb*, and so these claims cannot be anticipated by *Loeb*.

Accordingly, withdrawal of this rejection is respectfully requested.

Rejections Under 35 U.S.C. §103

Claims 42, 50-52 and 66-71 have been rejected under 35 U.S.C. §103(a) as being unpatentable over German Patent Document DE 31 21 968 A1 naming inventor Otto Grönecke (hereinafter, “*Grönecke*”). (Implicitly in view of *Loeb*; see *Office Action*, page 7, line 12). This rejection is respectfully traversed.

Using vacuum for evaporation in the context of the subject matter of the present invention is neither known nor obvious in view of the art. *Grönecke* does teach solvent recycling using several different methods, including air circulation, heat pumps and solar energy, as noted by the Examiner; however, neither *Loeb* nor any other known art teaches or suggests to one skilled in the art to use a vacuum produced in the claimed system for also assisting in solvent recycling. As explained above, *Loeb* does not disclose, much less teach, suggest or otherwise render obvious to the skilled artisan, the vacuum feature recited in the claims. (See, *Wang*, paragraph 9.) The combination of *Grönecke* with *Loeb* at most would suggest to the skilled artisan to include the recycling features of *Grönecke* in the system of *Loeb*, but would not teach, suggest or otherwise render obvious the claimed subject matter including the use of a vacuum produced in the solvent chamber to assist with recycling of the solvent.

Accordingly, withdrawal of this rejection is respectfully requested.

Claims 42 and 47-52 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Loeb* in view of *Grönecke*. This rejection is respectfully traversed.

As discussed in Applicant’s paper filed November 30, 2006, Claims 42 and 50 recite:

periodically applying and removing the increased pressure to a hydraulically driven piston which produces a substantial linear movement from which energy can be extracted.

exhausting solute solution from the pressure chamber; and
recycling solute solution after exhausting the solute solution from the pressure chamber by separating solute molecules from solvent molecules in the solute solution by applying the vacuum in the solvent chamber to the solute solution while vaporizing the solvent.

Neither *Loeb* nor *Grönecke* nor their combination disclose, teach, suggest or otherwise render obvious using the pressure generating apparatus to also produce a vacuum that is then

used in the recycling of the solvent and solute solution, as claimed. The lack of any disclosure, teaching or suggestion of this feature by either reference has been discussed above. Absent some statement or implication regarding the vacuum feature in at least one of these references, these references, either alone or in combination, cannot render the claims obvious.

The claim combines a piston apparatus with a recycling system that uses a vacuum naturally produced in the system to reduce or eliminate any external energy requirement for performing recycling of the solvent and solute solution working fluids. The vacuum is formed in the solvent chamber as solvent is depleted, and is applied to the spent solute solution to lower the vaporization energy required to separate solvent from solute solution. The references do not render these features obvious, as discussed above.

The combination of *Grönecke* and *Loeb* fails to render the claims obvious because it does not disclose, teach or suggest, or otherwise render obvious the combination of all the elements of either claim 42 or claim 50, including:

periodically applying and removing the increased pressure to a hydraulically driven piston which produces a substantial linear movement from which energy can be extracted.

exhausting solute solution from the pressure chamber; and
recycling solute solution after exhausting the solute solution from the pressure chamber by separating solute molecules from solvent molecules in the solute solution by applying the vacuum in the solvent chamber to the solute solution while vaporizing the solvent.

Dr. Wang also concludes that the overall combination is not obvious and should be protected under the patent laws. (See, *Wang*, paragraph 12.)

Claims 51 and 52 depend from claim 50, and so also cannot be obvious in view of the proposed combination. Claims 42 and 50-52 are therefore patentable over the combination of *Grönecke* in view of *Loeb*.

Accordingly, withdrawal of this rejection is respectfully requested.

CONCLUSION

In view of the foregoing amendments and remarks, reconsideration is respectfully requested. This application should now be in condition for allowance; a notice to this effect is

respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicant's attorney at the telephone number listed below.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee that is not covered by an accompanying payment, please charge any deficiency to Deposit Account No. 50/2762, Ref. E2002-700019.

Respectfully submitted,
Irving W. DeVoe, Applicant

By: /Gary S. Engelson/

Gary S. Engelson, Reg. No. 35,128
LOWRIE, LANDO & ANASTASI, LLP
One Main Street
Cambridge, Massachusetts 02142
Telephone: 617-395-7000
Facsimile: 617-395-7070